

시간 제한

1 초 (하단 참고)

메모리 제한

256 MB

## 문제

Another Security Hackathon is happening soon!

There are  $N$  employee participants, and each of them needs to be assigned to group A (for attacking a dummy system) or to group B (for defending the dummy system). Everyone's ability of attacking or defending is quantified based on their previous participation in a similar event. For convenience, let  $A[i]$  and  $B[i]$  be the  $i$ -th employee's attack score and defense score (the higher, the better).

There are  $2^N$  ways to assign  $N$  employees to two teams, and we wish to maximize the "fitness" of such partition. The fitness can be quantified by adding the attack scores of everyone in group A, the defense scores of everyone in group B, and applying a "penalty" that's to be described below.

There are  $M$  task forces in the company, and each task consists of 2 or more, but no more than  $N$ , employees. If two employees in the same task force are separated by the team assignment, then the "fitness" would be penalized by the (pre-defined) penalty of the said task force (each task force has an integer penalty value associated with it). Such penalty would be applicable to every pair of employees within the same task force (see the sample test cases).

For instance, suppose  $N = 3$  and the following describe attack scores and defense scores.

- Employee 1:  $A[1] = 10$  and  $B[1] = 0$
- Employee 2:  $A[2] = 10$  and  $B[2] = 5$
- Employee 3:  $A[3] = 5$  and  $B[3] = 5$

In addition, suppose  $M = 1$  and the only task force has Employee 1 and Employee 2 with a penalty of 100.

If we assign Employees 1 & 2 to group A and Employee 3 to group B, then the overall fitness would be  $10+10$  (from group A) +  $5$  (from group B) -  $0$  (penalty from task force(s)) =  $25$ . If we assign Employee 1 to group A and Employees 2 & 3 to group B, then the overall fitness would be  $10$  (from group A) +  $5 + 5$  (from group B) -  $100$  (penalty from task force(s)) =  $-80$ . Lastly, if we assign all three employees to group A and none to group B, then the overall fitness would be  $10+10+5 + 0 - 0 = 25$ . In this example, the maximum fitness we can obtain is 25, using either of the two team assignments described above. Note that it is allowed to assign all employees to either of the two groups because the company's cyber security team members will be assigned to group A and group B, in addition to the  $N$  employees.

Given  $N$ ,  $M$ , attack scores, defense scores, and information on task forces, compute the maximum fitness that we can achieve and output a team partition that results in the maximum fitness.

## 입력

The first line will contain the number of test cases,  $T$ .

For each test case, the first line will contain two integers,  $N$  and  $M$ , separated by a whitespace.

Each of the next  $N$  lines will contain two integers, describing an employee's attack score and defense score, separated by a whitespace.

The next  $2M$  lines will describe  $M$  task forces (two lines for each task force).

To describe the  $i$ -th task force: The first line (of the two lines) will contain  $K_i$ , the number of employees in this task force, and a penalty,  $S_i$  for this task force.

The second line will contain  $K_i$  integers describing employees in the task force. You can assume that these  $K_i$  numbers will be distinct.

## 출력

---

For each test case, you must output two lines.

The first line will contain one integer that is the maximum achievable fitness.

The second line will describe group A such that the first integer will be the number of employees in group A, followed by that many integers describing employees in group A.

If there are many ways to achieve the maximum fitness, you may output any one of them.

The order of employees in your output can be arbitrary.

## 제한

---

- $1 \leq T \leq 10$
- $0 \leq A[i], B[i] \leq 1,000,000$
- $2 \leq K_i \leq N$
- $1 \leq S_i \leq 1,000$
- An employee may belong to multiple task forces (see sample input)

## 서브태스크 1 (4점)

---

- $2 \leq N \leq 16$
- $1 \leq M \leq 100$

## 서브태스크 2 (18점)

---

- $2 \leq N \leq 120$
- $1 \leq M \leq 100$

## 예제 입력 1 복사

---

```

4
3 1
10 0
10 0
5 5
2 100
1 2
4 2
10 0
20 10
5 10
1 5
2 2
1 2
3 1
2 3 4
4 2
100 0
200 10
50 10
10 5
2 2
1 2
3 1
2 3 4
4 1
100 0
4 8
2 15
3 51
4 3
1 2 3 4

```

#### 예제 출력 1 복사

```

25
2 1 2
43
2 1 2
360
4 1 2 3 4
165
1 1

```

Caes 1:

This is discussed in the problem statement. "3 1 2 3" is another correct answer as stated earlier.

Case 2:

Group A = {Employee1, Employee 2} and Group B = {Employee 3, Employee 4} would result in the sum of 45 from attack and defense scores.

Task force 1 has penalty of 2, thanks to group A, no penalty would be applied.

Task force 2 has three employees, and due to (Employee 2, Employee 3) pair and (Employee 2, Employee 4) pair, the penalty would be applied twice (it's applied once per such separated pair).

Hence, the overall fitness is  $45 - 2 = 43$ .

Case 3:

By assigning everyone to group A, we can achieve the fitness of 360.

Case 4:

Group A = {Employee 1} and Group B = {Employee 2, Employee 3, Employee 4}.

The sum of attack scores and defense scores is  $100 + (8+15+51) = 174$ .

The sole task force has everyone in it, and its penalty is 3.

Since Employee 1 is separated from the other three, the penalty should be applied three times: The fitness is  $174 - 3*3 = 165$ , which is maximum in this case.

## 시간 제한 안내

---

아래 적혀있지 않은 시간 제한은 언어 도움말 (/help/language)에 적혀있는 기준을 따른다.

- Java: 3.5초
- Python 3: 3.5초
- PyPy3: 3.5초

## 채점

---

- 예제는 채점하지 않는다.